

We claim:

1. A process for the fractionation of water-soluble or water-dispersible amino-containing synthetic polymers having a broad molar mass distribution by ultrafiltration, wherein the polymer solution or dispersion to be fractionated is fed continuously into ultrafiltration circulation with at least one ultrafiltration unit, and retentate having a narrower molar mass distribution and permeate are discharged continuously, in such a way that the ultrafiltration circulation is essentially in a steady state.
2. A process as claimed in claim 1, wherein an aqueous medium having a polymer content of from 3 to 30% by weight is fed in.
3. A process as claimed in claim 1 or 2, wherein a retentate having a polymer content greater than 5% by weight is discharged from the circulation.
4. A process as claimed in any of the preceding claims, wherein from 20 to 90% by weight of the polymer used is separated off as permeate.
5. A process as claimed in any of the preceding claims, wherein the ultrafiltration is carried out through membranes having a cut-off for polymers with molar masses of from at least 1000 to 500,000 or through membranes having a pore diameter of from 0.01 to 10 μm .
6. A process as claimed in any of the preceding claims, wherein a plurality of ultrafiltration circulations connected in series is used.
7. A process as claimed in any of the preceding claims, wherein the membranes are used in the form of tubes, hollow fibers, plate-and-frame apparatuses, hollow fiber modules, cushion modules or spiral-bound modules.
8. A process as claimed in any of the preceding claims, wherein the ultrafiltration is carried out at an inlet pressure of from 1 to 20 bar.

9. A process as claimed in any of the preceding claims, wherein the ultrafiltration is carried out at a transmembrane pressure of from 0.5 to 10 bar.
- 5 10. A process as claimed in any of the preceding claims, wherein the ultrafiltration is carried out at an inflow of from 0.01 to 10 m/s.
- 10 11. A process as claimed in any of the preceding claims, wherein, in a multistage ultrafiltration, ultrafiltration units having a larger diameter or a larger channel width are used in the last stage.
- 15 12. A process as claimed in any of the preceding claims, wherein the amino-containing polymers are selected from polyalkylenepolyamines, polyamidoamines, polyalkylene glycol polyamines, polyamidoamines grafted with ethyleneimine and then reacted with at least bifunctional crosslinking agents, and mixtures and copolymers thereof.
- 20 13. An amino-containing synthetic polymer obtainable by a process as claimed in any of claims 1 to 12 in the form of the retentate or of a concentrate thereof or in the form of a polymer obtained from the retentate.
- 25 14. The use of the polymers contained in the retentate obtained by a process as claimed in claims 1 to 13, as retention aids, drainage aids and/or fixing compositions in papermaking, as promoters in the sizing of paper with alkyldiketenes, as flocculants for sewage sludges, as adhesion promoters in the production of laminated films, as additives in hair setting and skincare compositions and as compositions for immobilizing anionic active ingredients.
- 30 15. A process for the fractionation of water-soluble or water-dispersible synthetic amino-containing polymers by ultrafiltration, wherein the process comprises the following steps:
- 35 a) continuous passage of the polymer solution or dispersion to an ultrafiltration unit,
- 40 b) separation of the polymer solution or dispersion in the ultrafiltration unit into a permeate and a retentate,
- 45 c) discharge of the permeate from the process,

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- 5 d) discharge of some of the retentate from the process;
mixing of the remainder of the retentate with the polymer
solution or dispersion in step a) and, if required,
essentially polymer-free aqueous medium and passage of
the mixture to the ultrafiltration unit.

10 16. A process as claimed in claim 15, wherein that part of the
retentate discharged in d) is subjected to a further
fractionation by a process comprising the steps a) to d).

17. A process as claimed in claim 15 or 16, which comprises an
upstream startup phase which has the following steps:

15 a) continuous passage of the polymer solution or dispersion
to an ultrafiltration unit,

b) separation of the polymer solution or dispersion in the
ultrafiltration unit into a permeate and a retentate,

20 c) discharge of the permeate from the process,

25 d) mixing of the total retentate with the polymer solution
or dispersion in step a) and, if required, with
essentially polymer-free medium and passage of the
mixture to the ultrafiltration unit until the desired
degree of fractionation has been reached in the
retentate.

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